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Singapore to establish Smart Digital and Multiplex Path lab

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A!maginostic and A*Star's IMCB collaborate to use Image Processing and Artificial Intelligence/Machine Learning to revolutionize pathology practice and provide more precise cancer diagnostic assays

A!maginostic (A!), an A*STAR spin-off that specialises in computational digital pathology, and A*STAR's Institute of Molecular and Cell Biology (IMCB) have launched a joint digital immuno-oncology laboratory on 25th Nov 2019 in Singapore.

Located at IMCB, the new IMCB-A!maginostic Joint Lab of Excellence aims to provide artificial intelligence (AI) and machine learning (ML) solutions to support computational digital and multiplex pathology, by integrating multi-modality images and clinical data, including patient treatment and survival status.

Through this partnership, the lab's goal is to speed up and improve the workflow of pathologists, enabling more accurate diagnosis for cancer which can help to speed up drug development for treatment. The lab will support the medical and research communities and will be open to partner biotech companies to develop new capabilities in digital pathology.

The lab will build a cloud-based large-scale pathology database of annotated cancer tissue images to develop AI and ML algorithms for digital diagnosis. A! has licensed A!HistoNote, a cloud-based digital pathology annotation technology solution from A*STAR's commercialisation arm A*ccelerate, for this purpose. The database will start with prostate and breast cancers, and eventually extend to other major cancer indications such as endometrial cancer, liver cancer and lung cancer.

The lab's approach is to provide a complete service solution ranging from staining, scanning, storage and analysis of specimens stained by hematoxylin and eosin (H&E), to immunohistochemistry (IHC) and multiplex immunofluorescence (MIF). The services on offer include multiplex immunostaining, digital Whole Slide Image (WSI) scanning, large data storage and management system, AI/ML-based image processing/analysis, and informatics and modelling solutions. IMCB and A!maginostic have signed a three-party MOU with Ultivue Inc., a provider of kits and reagents for multiplex tissue marker detection and quantification, to support the Joint Lab of Excellence research activities.

Professor Hong Wanjin, Executive Director of IMCB, said, "The joint lab is an example of the outcome of use-inspired and mission-driven research of IMCB. IMCB will keep focusing on novel technology development and its future commercialisation to realise the social and economic value of research work. This joint lab provides a unique platform and a highly experienced technical team that will impact the field of digital and multiplex pathology in the near future."

Professor Tan Soo Yong, Head of Pathology at the National University Hospital/National University of Singapore, said, "Digital pathology is transforming the practice of histopathology. The AI/ML revolution will impact the way diseases are diagnosed, as early as the next 5 to10 years. For advances in imaging and bioinformatics research to translate into societal benefits and economic impact, the collaboration of healthcare institutions, research institutes and private companies is crucial. As an example of visionary leadership and strategic planning, this joint lab has provided strong support for our ongoing projects, with many more collaborations to come in the future."

Dr Yu Weimiao, Vice President and Chief Technical Officer of A! and Head of IMCB's Computational Bioimage Analysis Unit, said, "Digital pathology is only the first step and foundation of AI/ML solutions to relieve the heavy workload of clinical pathologists. The shortage of pathology recourse will become more severe in the coming 10 to 20 years. With the recent rapid development of immunotherapies, multiplex pathology solutions enable us to accurately profile cancer patients' immune systems and optimise targeted treatment to maximise benefits to patients and save resources for the public healthcare system. To achieve such goals, automatic image processing and AI/ML-based solutions hold the keys to the future."